

**steppIR**  
COMMUNICATION SYSTEMS



# ***WIRELESS REMOTE BOARD SETUP INSTRUCTIONS***

## Welcome

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The wireless remote board removes the need for lengthy control cable and eliminates concerns of lightning damage to your controller. It accomplishes this by replacing the Cat 5 cable with Green Heron Everywhere radio links. The controller can sit next to the radio while the remote driver is located at the base of the tower.

*If you purchased a new controller with the wireless remote board, your controller and remote board are paired and ready for setup. Skip to page 13 and proceed with setup and installation.*

*If you purchased the wireless remote board as an upgrade to an existing controller or controller/tethered remote board pair, then there are some additional steps that you will need to go through to modify your controller.*

## GHE Radio Setup

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Your wireless link boards will arrive programmed to the same channel. However, if you plan on using more than one controller with a radio link they will need to be on different channels. Also, if you are using XBee radios for other controls they must be on different channels. The following instructions walk you through the setup process for the XBee radios.



**Fig. 1** XBee radio and USB adapter

*You will need 2 XBee radios, the USB adapter and XCTU configuration software.*

**Step 1:** Plug a radio into the USB adapter and connect the mini USB.

**Step 2:** Start XCTU software.

**Step 3:** Select the Discover Radio Modules icon.

**Step 4:** Select the com port the radio is connected to and select Next.

**Step 5:** Leave the default settings and select Finish.

**Step 6:** Wait for the program to find the radio and then select Add Selected Device.

**Step 7:** Set the Channel using the configuration tab.

**Step 8:** Press Write and disconnect the USB.

**Step 9:** Repeat steps 4 through 9 with the second radio.

**Step 10:** Install the one radio in the SDA controller.

**Step 11:** Install the other radio on the remote driver board.

## Controller Modification

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If you purchased the wireless remote board as an upgrade to an existing controller (or controller/tethered remote board pair) you will need to modify the controller to install the wireless board and antenna.

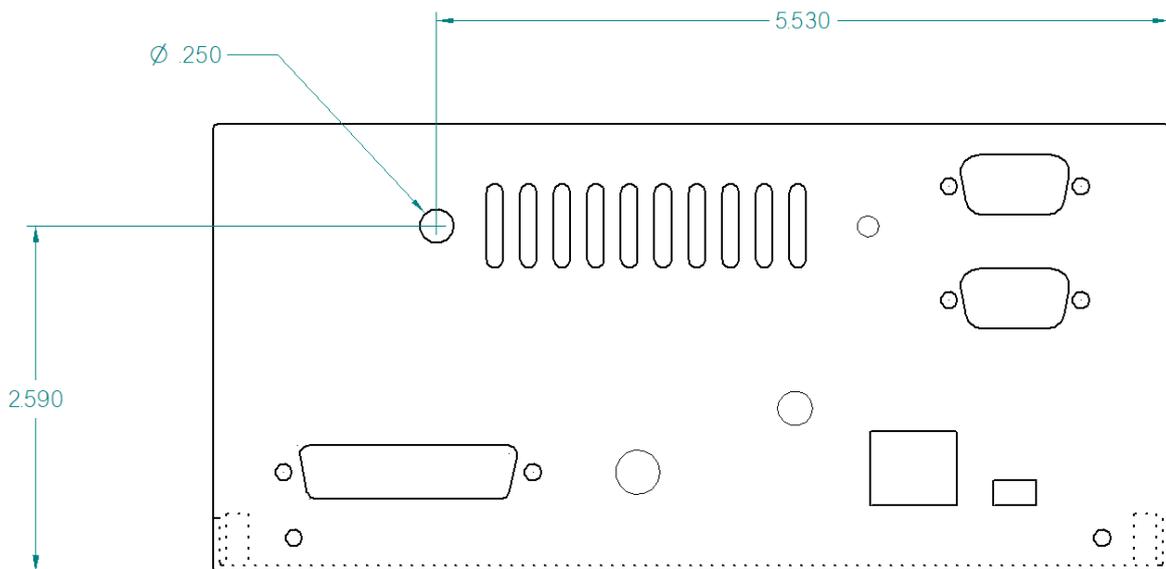
**Step 1:** Disconnect the controller from any power source. Then disconnect the antenna control cable.

**Step 2:** Remove the cover from the controller by unscrewing the four screws (two on each side).

**Step 3:** Unplug the display board from the driver board by disconnecting the 20 pin IDC cable that connects them.

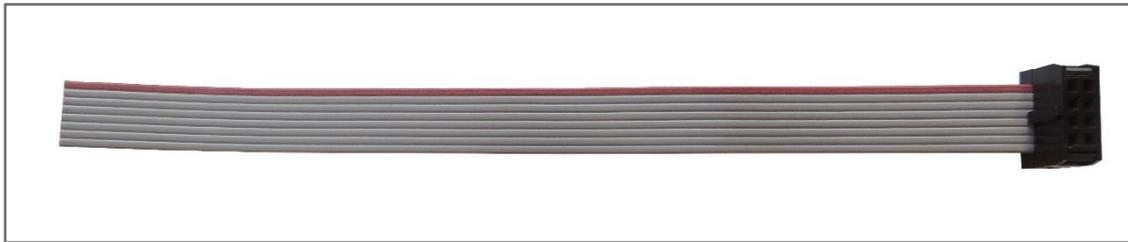
**Step 4:** Unscrew the screws holding the driver board to the controller and remove the driver board. There will be two or three philips head screws holding the board to the bottom of the controller and two or more hex screws on the back.

**Step 5:** Using the following diagram as a guide, drill a  $\frac{1}{4}$  inch hole in the back of the controller chassis. The exact placement of the hole is not important.



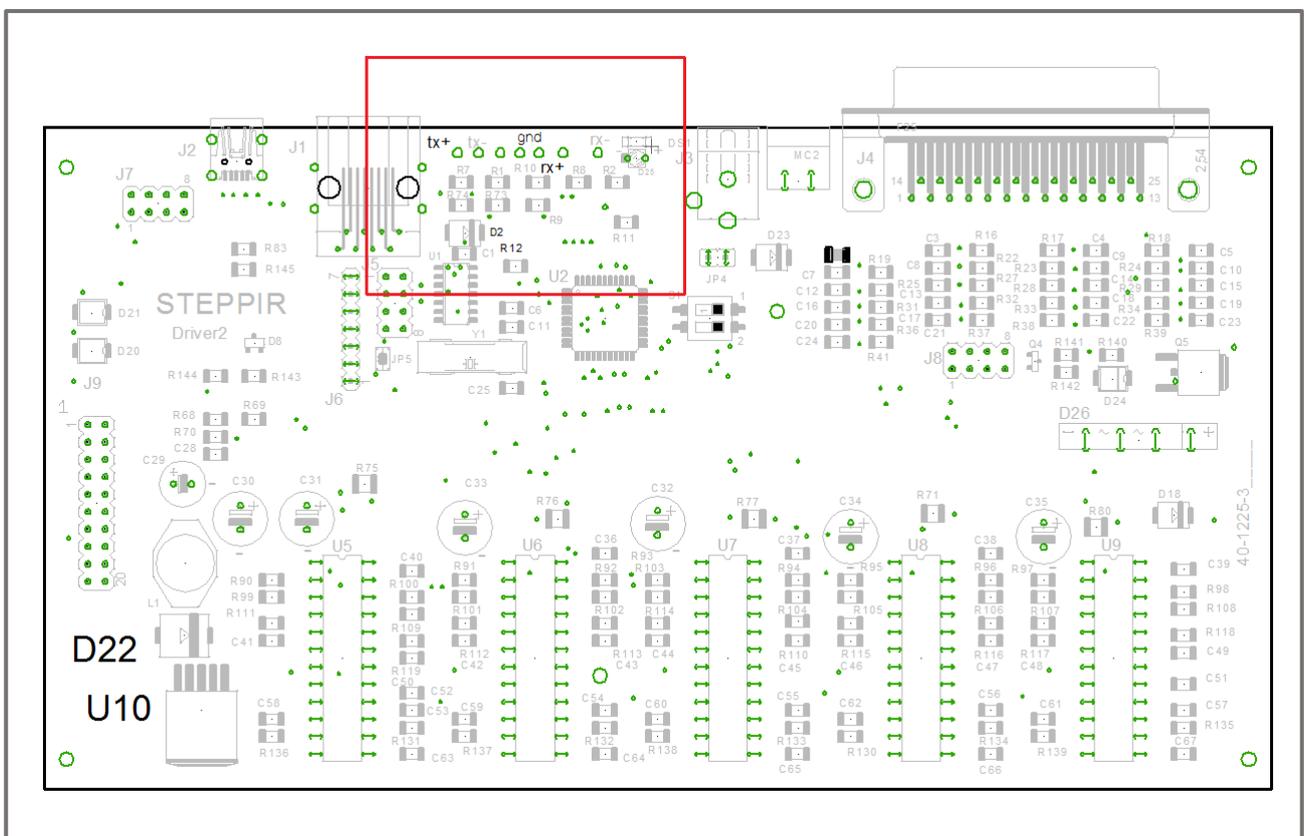
**Fig. 2** Antenna hole location.

**Step 6:** Prepare the included 6" length of flat ribbon cable to connect the driver board and the remote board. This cable will have a 2x4 IDC socket on one end, and the other end will need to have the wires 1, 2, 6, 7, and 8 separated, stripped, and tinned to prepare for soldering. *Note: The ribbon cable has a red wire on one side. That red wire is wire #1, the one next to it is #2, and so on.*



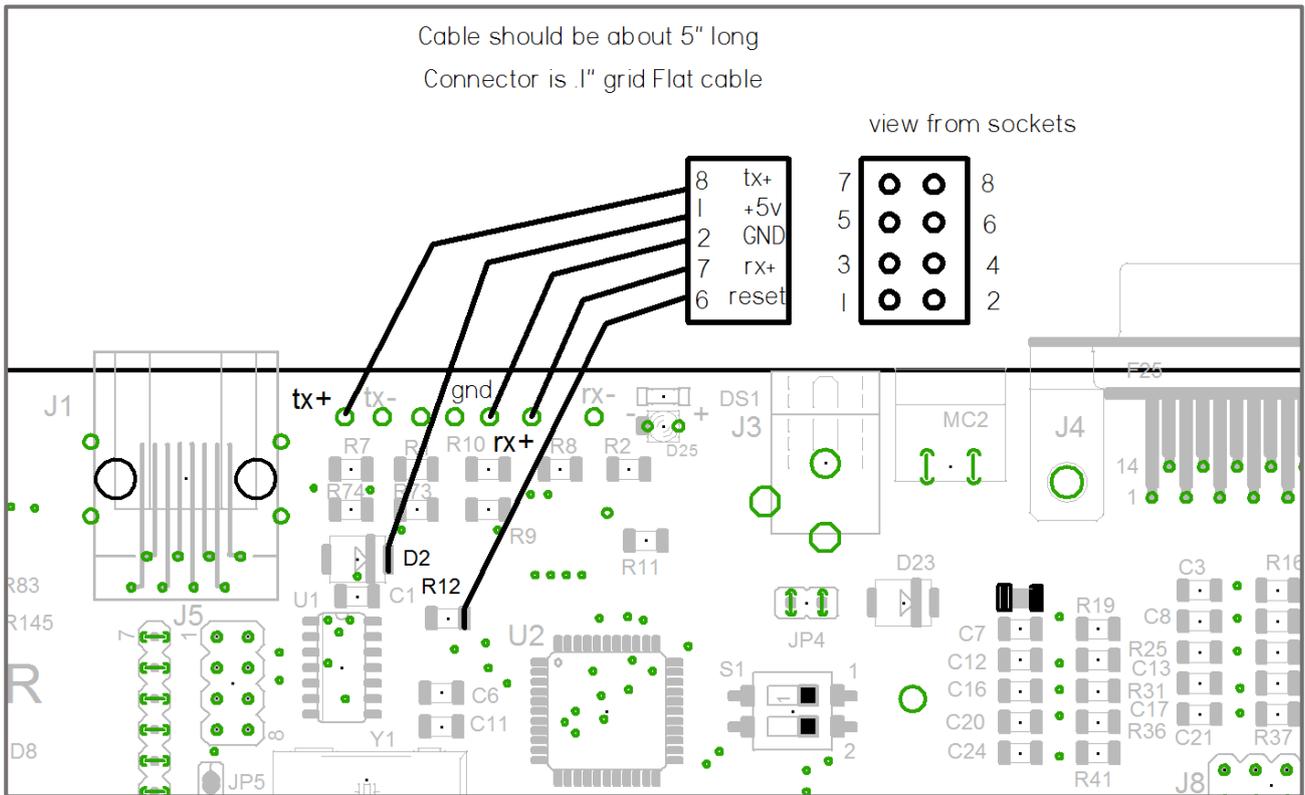
**Fig. 3** Ribbon cable

**Step 7:** Locate the area shown inside the red box in Figure 4.

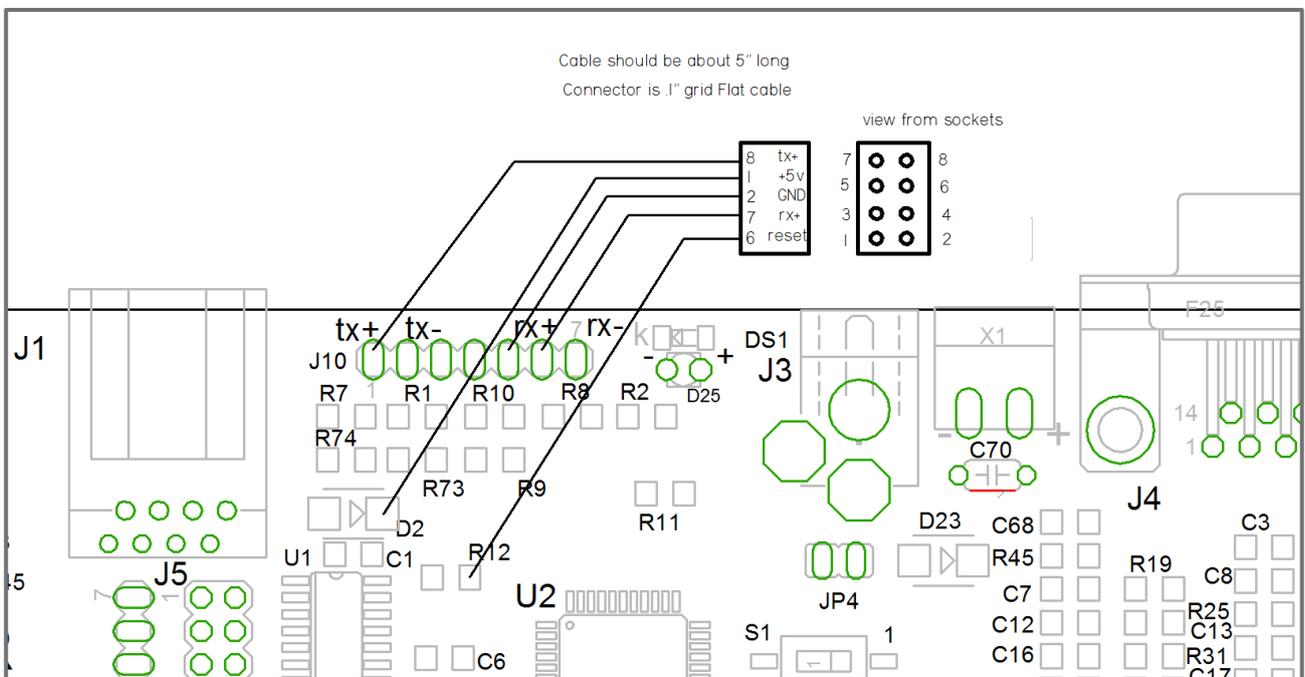


**Fig. 4** Driver Board Pad Locations

**Step 8:** Solder the ribbon cable to the driver board based on the schematics below. The specific connections are shown in Figure 5 and Figure 6. *Note: If you have an ALP driver board, refer to Figure 5. Refer to Figure 6 if you have a standard driver board.*

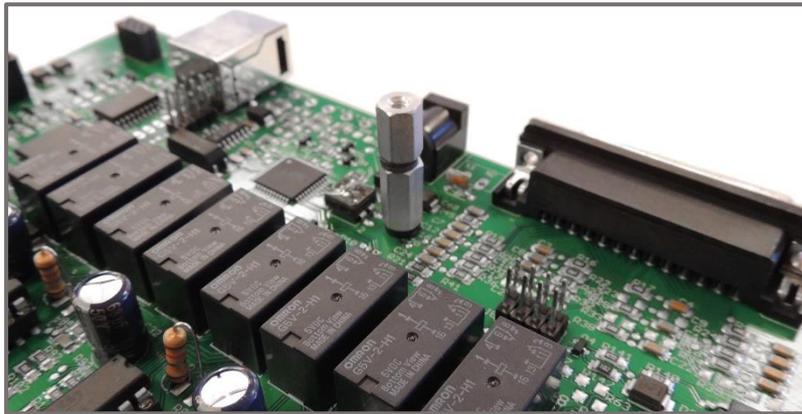


**Fig. 5** ALP driver board pad locations.



**Fig. 6** Standard driver board pad locations.

**Step 9:** Screw the included jack screw and fiberglass washer into the existing standoff on the driver board as shown in Figure 7. *Note: If the driver board has a relay board installed, omit the washer.*



**Fig. 7** Jack screw installed in hex standoff.

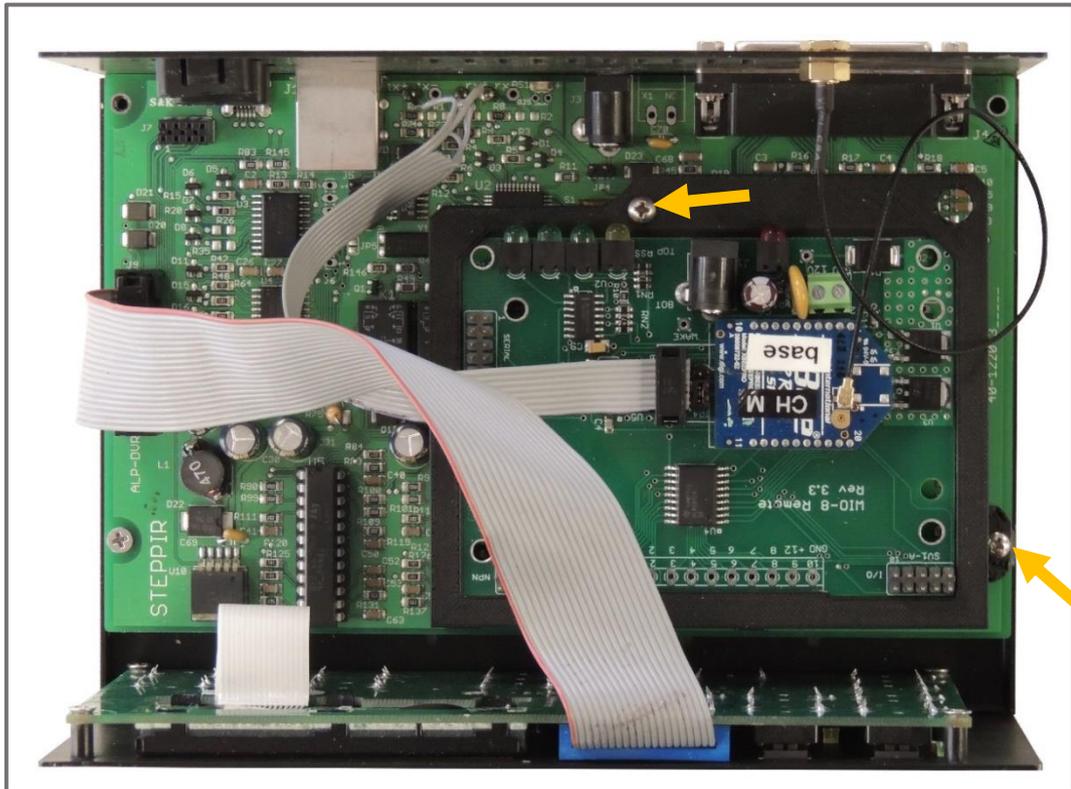
**Step 10:** Place the driver board back into the controller chassis.

**Step 11:** Place the mounting bracket on the driver board, aligning with the jack screw and mounting holes.



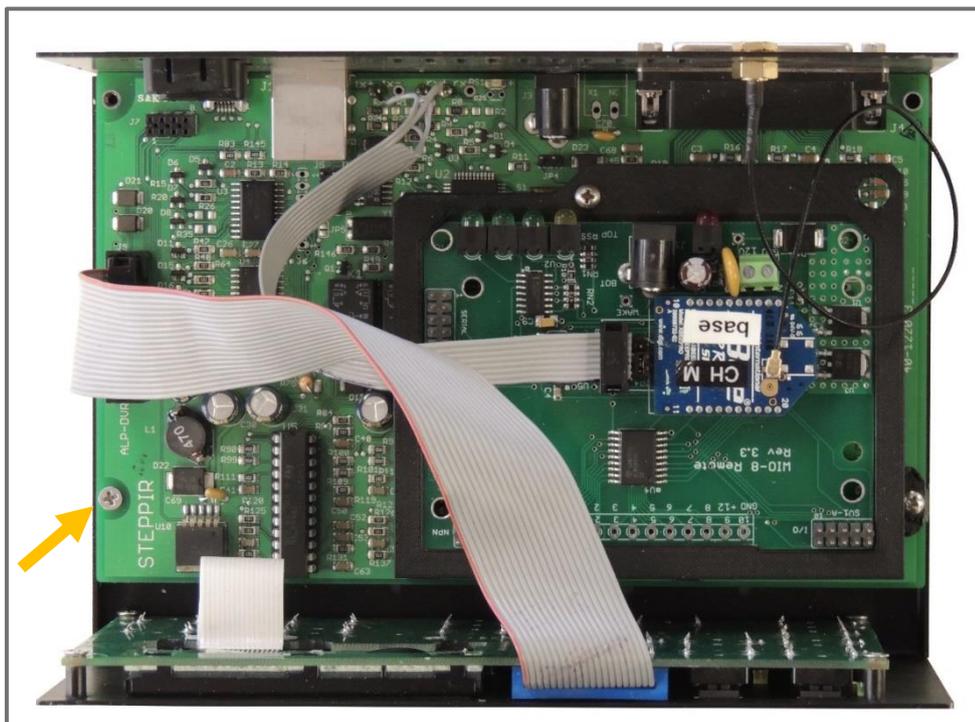
**Fig. 8** Mounting bracket with GHE remote board and Wi-Fi module installed.

**Step 12:** Screw the mounting bracket to the driver board using the included pan head screws as shown in figure 9. One screw will fix the mounting bracket and driver board to the controller chassis, and the other will fix the mounting bracket to the standoffs installed in step 9.



**Fig. 9** Install the indicated screws.

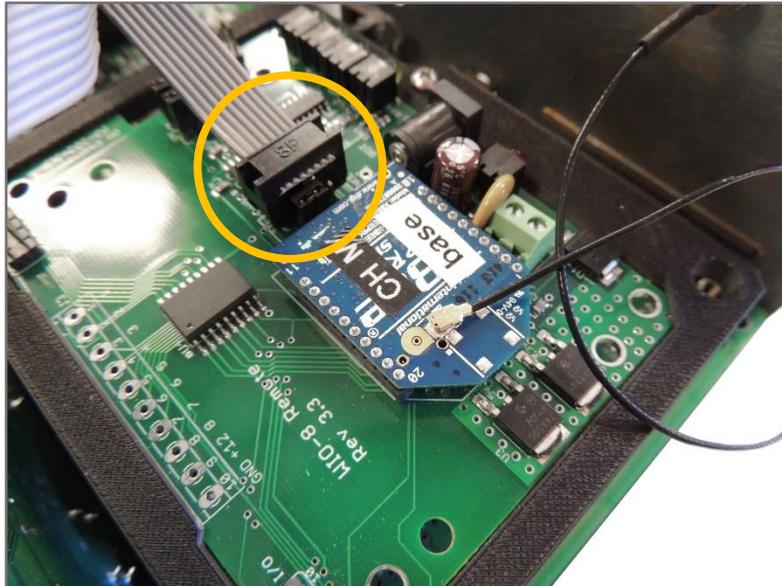
**Step 13:** Screw the countersunk Phillips head screw you removed in step 4 back into the chassis, fixing the driver board in place.



**Fig. 10** Install the indicated screw.

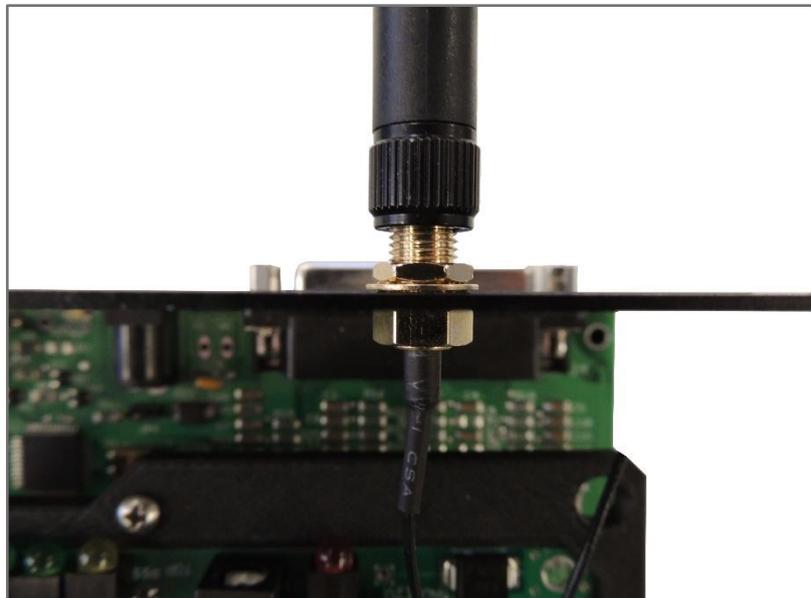
**Step 14:** Plug in the display board by connecting the 20 pin IDC cable into the socket on the driver board.

**Step 15:** Plug the 8-pin ribbon cable into 8-pin TTL connector as shown in Figure 11. Make sure the wire is oriented the correct direction!



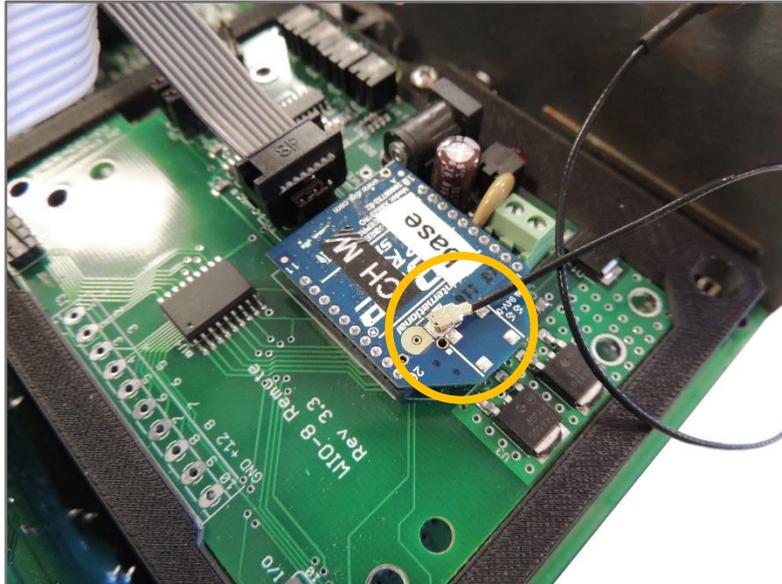
**Fig. 11** Proper orientation of ribbon cable.

**Step 16:** Mount the antenna extension in the 1/4" hole you previously drilled into the metal frame.



**Fig. 12** Antenna installed in chassis.

**Step 17:** Plug the other end of the antenna extension into the connector on the Wi-Fi board.



**Fig. 13** Wi-Fi antenna connection

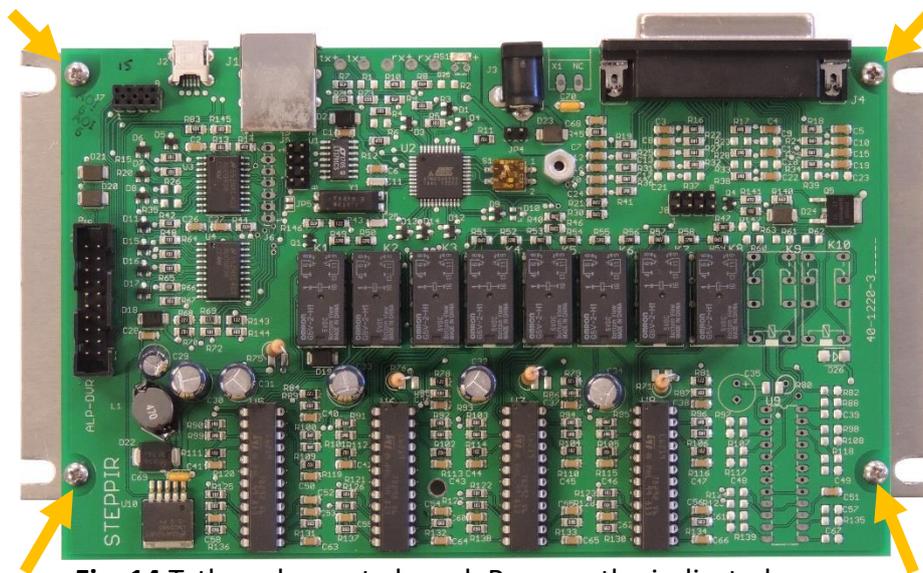
**Step 18:** Replace the cover of the controller.

## Remote Board Modification

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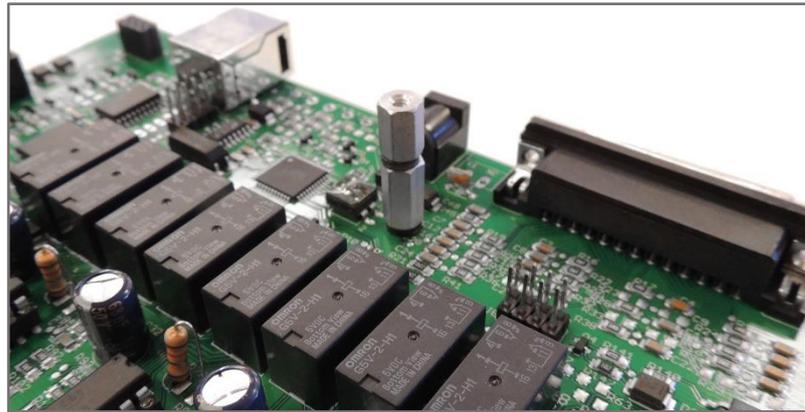
*If you own a tethered remote board and purchased the wireless remote board as an upgrade, you will need to modify your tethered remote board.*

**Step 1:** Unscrew the pan head screws from the aluminum mounting bracket. *(If a relay board is installed, remove the pan head screws holding the relay board as well.)*



**Fig. 14** Tethered remote board. Remove the indicated screws.

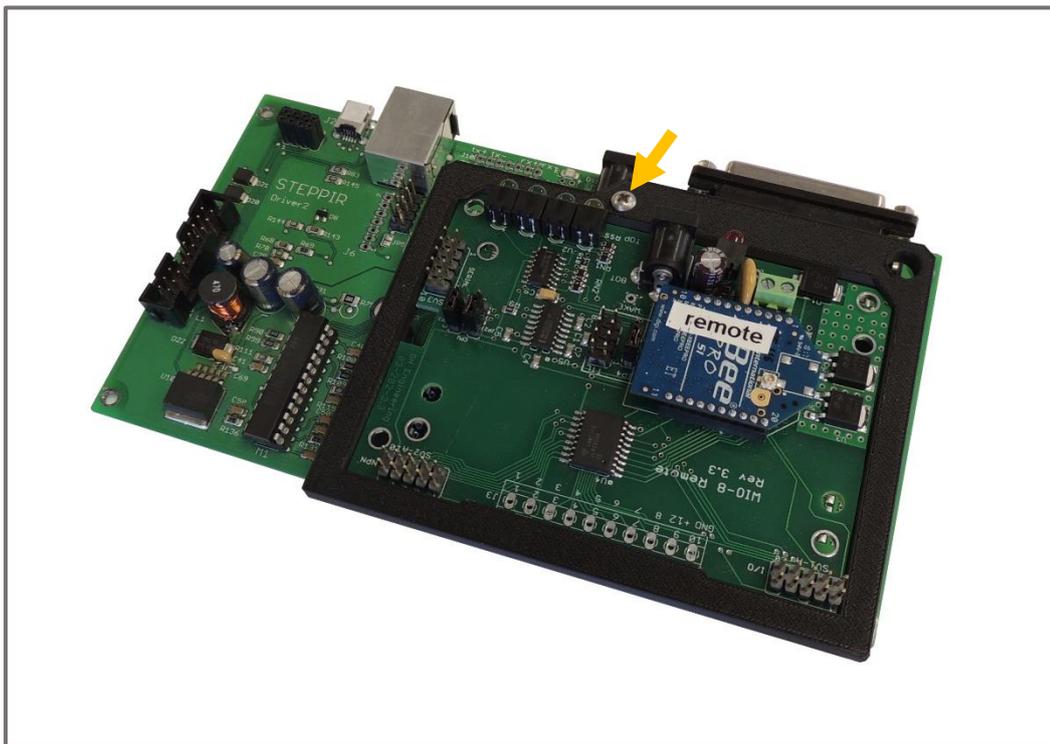
**Step 2:** Screw the 3/8" jack screw into the hex standoff with a washer in between. *If the driver board has a relay board installed, omit the washer.*



**Fig. 15** Jack screw installed with fiber washer

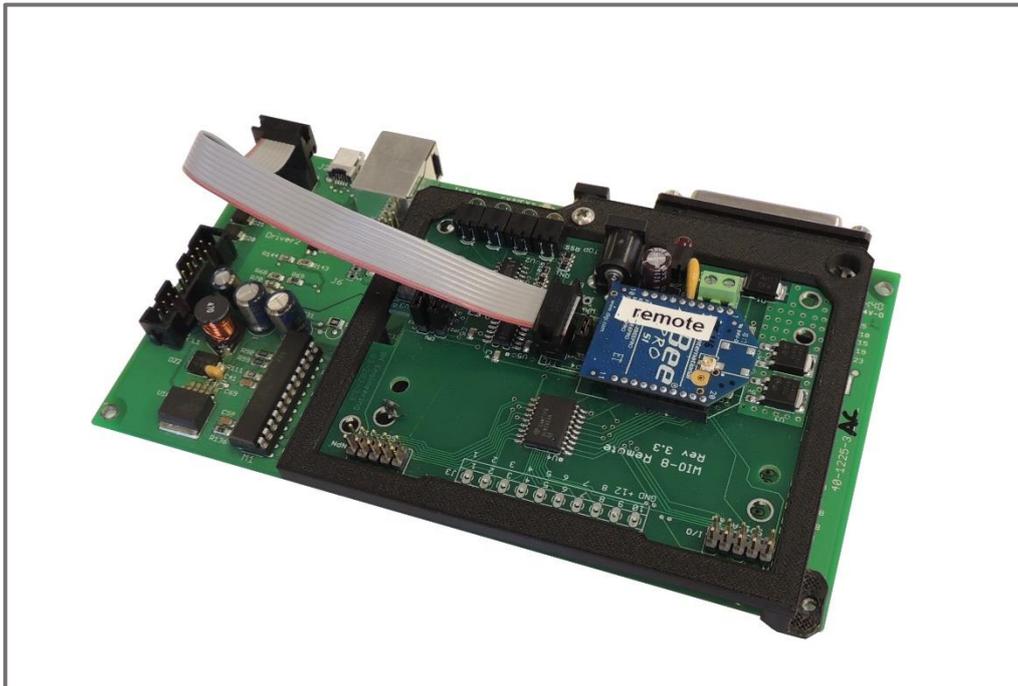
**Step 3:** Place the mounting bracket on the driver board, aligning with the standoff and mounting holes.

**Step 4:** Screw the mounting bracket to the driver board using a pan head screw, as shown in Figure 16.



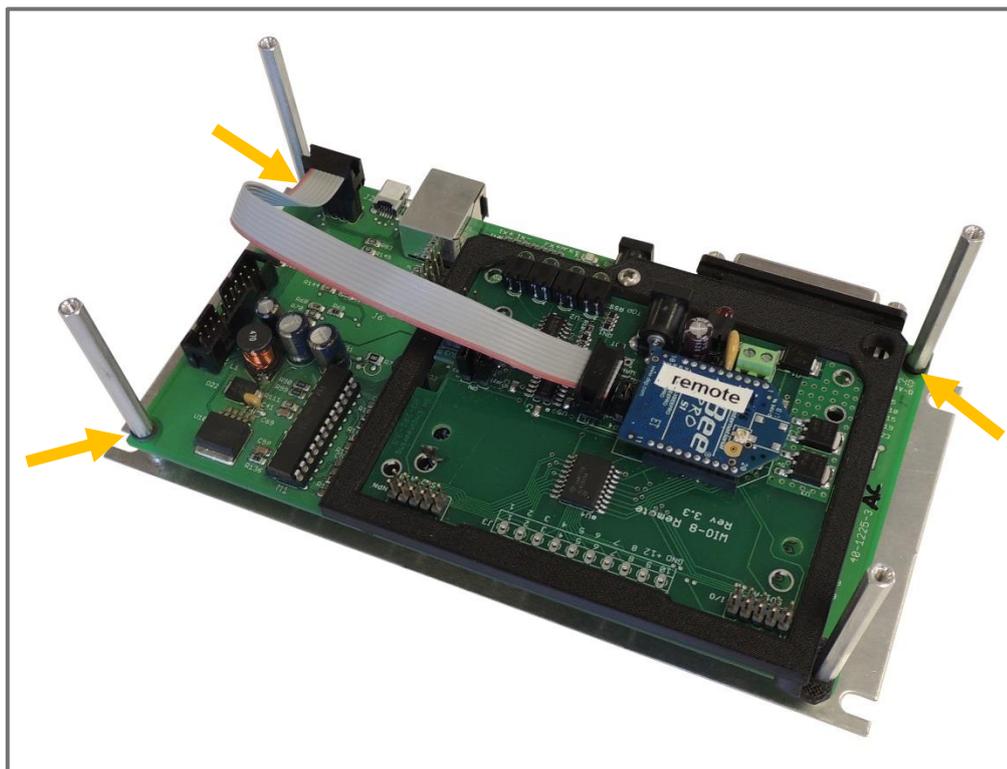
**Fig. 16** Wi-Fi board installed on remote driver board.

**Step 5:** Connect the ribbon cable as shown in Figure 17. The male connector pairs with the female socket (J7) on the driver board. The other end connects to the Wi-Fi board. Make sure the wire is oriented the correct direction!



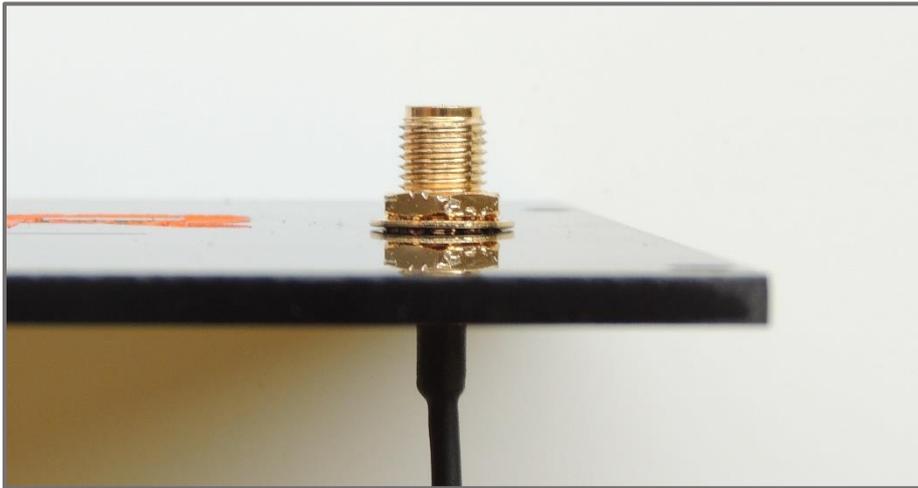
**Fig. 17** Ribbon cable installed.

**Step 6:** Replace the pan head screws holding the driver board onto the aluminum mounting plate with the 2-inch hex standoffs. Place washers between the hex standoffs indicated by the arrows and the driver board as shown in Figure 18.



**Fig. 18** Hex standoffs installed.

**Step 7:** Install the Wi-Fi antenna in the hole on the acrylic panel.



**Fig. 19** Wi-Fi antenna installed on acrylic panel.

**Step 8:** Connect the Wi-Fi antenna to the Wi-Fi board.



**Step 9:** Place the acrylic panel on top of the hex standoffs and fasten using the pan head screws that were removed in the previous step.



**Fig. 20** Finished wireless remote board.

Note: If you are using an SDA 2000 you will need to have firmware version 117 installed in order to use the wireless driver link. You can check your firmware version in the Setup > Software Version menu. Contact [support@steppir.com](mailto:support@steppir.com) with inquiries regarding upgrading your firmware.

## Controller Setup

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1. Connect the controller power, 24 to 33 VDC.
2. From the **Setup > Options** menu, turn Remote ON and Driver Delay ON.
3. Antenna selection – select the correct antenna model from the **Setup > Antenna Selection** menu.
4. Test the link before deploying remote board. Set the boards up next each other and make sure the controller is seeing the remote board, both GHE radio boards should have all their LEDs lit. Check the **Setup > Software Version** menu to make sure the firmware version (117) for the remote board is being displayed.
5. The GHE radio LEDs inside the SDA can be viewed through the rear center air vents.
6. There will be a “*driver problem*” message on the SDA controller display if the remote driver is not attached to the antenna. You should check the **Setup > Fault Code** menu to make

sure there are no check driver configuration error messages, this would be an indication that the remote driver is not communicating with the SDA controller. An “*antenna cable open*” message is OK if the antenna cable is not attached to the remote driver board. A “*driver chip error*” message indicates that one of the driver chips is bad or missing.

7. If the remote driver is attached to the antenna and you see an occasional flash of “*driver problem*” on the SDA controller, this is an indication that you do not have enough signal strength.

## Wireless Remote Driver Setup

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1. Since the Wi-Fi antenna is mounted on the remote driver board it should be mounted high enough above ground to clear obstructions. One option is to use a coax to move the antenna higher, the coax should be kept as short as possible since it can be quite lossy.
2. The remote driver requires 30 to 33 VDC.
3. To protect the driver from static discharge a good Earth ground is needed. You can either connect the mounting plate or control cable shield at the 25 pin connector to ground.
4. If signal strength is not giving a reliable connection and moving the Wi-Fi antenna is not helping you can purchase high gain Wi-Fi antennas. It should be possible to get a reliable connection over 1000 feet or more.

## Installation

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The radio link uses frequencies that operate via line of sight (2.4Ghz), they do not go around corners well. Some windows can be quite lossy because the same technology that limits IR radiation can limit 2.4 GHz RF as well. Mounting a base antenna just outside the window can have a dramatic effect on range. In general, mount your units with as close to LOS (line of sight) conditions as you can, maintain clearance from large metal and other RF blocking objects like reinforced concrete walls and foil backed insulation. If the operating station is in a basement, or there is a building or other obstruction between the station and the antenna tower, some antenna work may be required. The antennas are removable and can be extended using 50ohm coax.

The on-board LEDs allow easy range testing and mounting experimentation of your units. For reliable communications there should be 3 LEDs ON. The more obstructions you have, the stronger signal you will need due to signal fade.

1 LED = Threshold	
2 LED = 10 dB fade margin	
3 LED = 20 dB fade margin	
4 LED = 30+ dB fade margin	

## System Setup

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1. Once everything is properly connected, verify signal strength at both ends (3 leds is OK).
2. Make sure the controller is not displaying any error messages. If there is a steady “*driver problem*” message (keeps flashing every 3 to 5 second) check **Setup > Fault Code** menu for the problem.
3. If there is an occasional random driver problem message, this is a indication that the signal

is dropping out. The antenna will still work fine this way so you can choose to live with it. To solve the problem, boost signal strength by removing obstructions.

4. Verify the antenna tunes correctly.